

Studies of Socotran birds VII. Forbes-Watson's Swift *Apus berliozi* in Arabia—the answer to the mystery of the 'Dhofar swift'

by Andrew Grieve & Guy M. Kirwan

Received 6 March 2012

SUMMARY.—Analysis of specimens of *Apus* swifts held in the Bonn, Tring and Washington museums, previously identified as Common Swift *A. apus pekinensis* or Pallid Swift *A. pallidus*, and collected in southern Arabia, revealed all of them to be Forbes-Watson's Swifts *A. berliozi*, and probably of the doubtful subspecies *bensoni*, previously known only from coastal Somalia (where it breeds) and winter-collected specimens in south-east coastal Kenya. The Arabian specimens, all taken in south-west Oman or southern Yemen, were confidently identified as *A. berliozi* based on a combination of plumage, especially vocal, and biometric characters, which eliminate all other possible species. These specimens and the evidence of recent sight records demonstrate that *A. berliozi* is a locally common summer visitor to parts of the southern Arabian coast and the immediate hinterland, as well as a handful of offshore islands. The migrant or partially migratory *A. b. bensoni* is separable only on its marginally longer wing from nominate *A. berliozi*, which is apparently confined to Socotra, where it is resident or largely so.

Originally described as a subspecies of Pallid Swift *A. pallidus* Shelley, 1870, Forbes-Watson's Swift *Apus berliozi*, Ripley 1966, is usually considered to be restricted, as a breeder, to Socotra (*A. b. berliozi*) and coastal (perhaps also inland) Somalia (*A. b. bensoni*, Brooke, 1969), some of which move south to coastal Kenya in the non-breeding season (Brooke 1969, Fry 1988, Chantler & Driessens 2000). It is worth remarking that the date of authorship of *A. berliozi* has usually been ascribed to 1965 (Dickinson 2003), but is correctly assigned to 1966 (GMK pers. obs. 2006; Dickinson *et al.* 2011). Taxonomy of the Pallid Swift superspecies is especially complex. In addition to the two species already mentioned, the group also includes African (Black) Swift *A. barbatus* (P. L. Sclater, 1865), which occurs disjunctly through sub-Saharan Africa, principally in the south and east, and Bradfield's Swift *A. bradfieldi* (Roberts, 1926) of south-west Africa, with some authorities (e.g., Sibley & Monroe 1990, Gill & Wright 2006) also recognising *A. barbatus balstoni* (E. Bartlett, 1880), of Madagascar, and *A. b. mayottensis* (Nicoll, 1906), of the Comoros, at the specific level, as Malagasy Black Swift *A. balstoni*.

In recent years, various authors (e.g., Evans 1994, Jennings 1995, Chantler & Driessens 2000, Tibbett 2006) have promulgated that the range of *Apus berliozi* is rather wider than hitherto realised, encompassing parts of southern Arabia, between the Dhofar region of south-west Oman in the east to the environs of Aden (Yemen) in the west. Records of 'mystery' swifts in Arabia span more than 50 years, since Smith (1956) reported some unusual swifts, perhaps breeding, in southern Yemen in June 1954, with further reports of unidentified *Apus* in the same country in November 1985 and January 1986 (Brooks *et al.* 1987). Reports from Jeddah and Jizan, as well as the Eastern Province (all in Saudi Arabia) of Plain Swift *A. unicolor* (a species endemic as a breeder to Macaronesia) were rejected understandably by Jennings (1981) and Stagg (1984). Gallagher & Woodcock (1980) mentioned the presence of apparent Common Swifts *A. apus pekinensis* in Dhofar in July and

October, which statement was based on two specimens obtained by M. D. Gallagher in 1977 (Gallagher & Rogers 1980), both at the Natural History Museum, Tring. Shortly thereafter, Bundy (1986) reported coastal colonies of what he considered to be probably *Nyansa Swift* *A. niansae*, although the Oman Bird Records Committee did not accept the identification.

It seems probable that not all of the above reports relate to the same (unidentified) species of swift, but what is clear is that since Bundy's observations quite some interest and attention has been paid to what has come to be known as the 'Dhofar swift'. This bird appears to be a common breeding summer visitor to coastal cliffs in south-west Oman, and many observers have noted the apparent close resemblance of these birds to *Apus berliozi*, though presumably relatively few of these had field experience with the latter. In May 1993, J. S. Ash and G. Nikolaus acquired three specimens (now held in The Natural History Museum, Tring, the National Museum of Natural History, Washington DC, and the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn) of the mystery *Apus* but failed to resolve their identity, although *A. berliozi* was apparently ruled out as a possibility at this time (Eriksen *et al.* 2003). Given Ash's familiarity with *A. berliozi* in Somalia, to some extent this finding appeared to quell interest in the issue. However, further field observations by ourselves of swifts feeding over Salalah in southern Oman in April 2005, which GMK immediately identified as Forbes-Watson's Swifts based on his Socotran field work, prompted a new investigation into the identity of the 'Dhofar swift'. Simultaneously, other colleagues have also tended to assign some populations of swifts breeding in extreme southern Arabia to *A. berliozi*, including Porter & Aspinall (2010) and this course was also adopted by Kirwan (2010).

Material and Methods

Specimens.—All *Apus* specimens, except Alpine Swift *A. melba* and Little Swift *A. affinis* from Arabia and Socotra held in The Natural History Museum, Tring (BMNH), and the National Museum of Natural History, Smithsonian Institution, Washington DC (NMNH), were examined and descriptions for all taxa compiled. Morphometric data were acquired according to standard procedures (see below and Table 2). In addition, a description was compiled and morphometric data collected for a further taxon, *A. p. bensoni*, to compare with those swifts occurring and breeding in Arabia and Socotra. Data were also collected for a sample of *A. a. pekensis* from their breeding range, for comparison, given that the Dhofar swifts had previously been ascribed to this taxon. Our analyses included the types of *A. b. berliozi* (NMNH 518025) and *A. b. bensoni* (NMNH 519515), as well as a few specimens of *A. apus* from coastal East Africa.

The following data were obtained from each specimen: wing (flattened) and tail length, using a standard metal wing-rule with a perpendicular stop at zero (precision 0.5 mm), and using digital callipers (precision 0.01 mm) for the following: the distance between the tip of the longest and the tip of the shortest tail feather, which procedure has previously been used to measure the tail fork (e.g., Brooke 1969), the maximum width of the longest and second longest tail feather, and the depth and width of the pale throat patch. Wherever possible, we excluded specimens known to be non-adult from our statistical analyses, as younger birds could have differently shaped rectrices and smaller and paler throat patches.

The three specimens collected in Dhofar, Oman, by J. S. Ash and G. Nikolaus, in May 1993 were re-examined. These specimens (one male and two females) are separately housed in the National Museum of Natural History, Washington DC (NMNH 609005), Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn (ZFMK-Orn. 95.008), and the Natural History Museum, Tring (BMNH 1994.2.1). That in the Natural History Museum, Tring, was formerly housed with the *A. a. pekensis* specimens from Iran, India and

China. The two specimens (one male, the other unsexed) obtained by S. M. Brogan, M. D. Gallagher and T. D. Rogers in Dhofar were also examined at the Natural History Museum, Tring (BMNH 1977.21.16 and BMNH 1977.21.17). This gave a total of five so-called 'Dhofar' swifts available for general analysis, all of which were labeled as *A. a. pekinensis*; however, BMNH 1977.21.17 was not subject to statistical analysis as it is a juvenile (see above). In addition, a further six swifts (four males, two females) obtained by H. L. Powell from Aden in March–April 1922, and also housed in the Natural History Museum, Tring, were critically examined; hereafter referred to as the 'Aden' swifts, these were all labeled and originally identified as *A. pallidus brehmorum* (Meinertzhagen 1924; BMNH 1965.M.5539–5544).

Vocal analysis.—Sound-recordings of 'Dhofar' swifts were made at Tawi Atir, near Salalah, Oman, on 17 September 2007, by AG, using a Sony D5 recorder and parabolic reflector with Telinga PRO4 microphone. The same parabolic reflector and microphone were used to make recordings of Common Swifts *A. apus pekinensis* at Bukhara, Uzbekistan, on 11 May 2009, using an Edirol R05 digital recorder, for comparison with the 'Dhofar' swift recordings. Data for *pekinensis* was used in this analysis as it is this subspecies that is considered most likely to occur on passage in southern Arabia, and all specimens of the 'Dhofar swift' were ascribed to this taxon. Additionally, a sound-recording of Pallid Swift *A. pallidus brehmorum* was accessed on www.xeno-canto.org, recorded at Uludağ, in north-west Turkey, in May by S. Fisher (XC25820) to provide further comparisons with the 'Dhofar swift' recordings. Finally, a sound-recording of Forbes-Watson's Swift made on Socotra Island in February was provided by R. F. Porter.

Analysis of the sound-recordings was undertaken using WaveSurfer software (Sjölander & Beskow 2000) from which maximum, minimum and mean peak frequencies within each burst of 'screaming' were measured using a Hamming window and a fast Fourier transformation of 2,048 points at a sampling rate of 44,100 kHz. Sonograms were produced in the software Raven using a FFT-length of 256 points in a Hamming window.

Photographs and field work.—Field photographs by AG were taken of 'Dhofar swifts' in April and May 2005 (Fig. 2) and September 2007, and were compared to photographs of a Forbes-Watson Swift trapped on Socotra Island in spring 1993 (see Porter & Martins 1996: plates 25–26). For another field image from southern Oman, see Jennings (2010: 99). GMK studied *A. berliozi* on Socotra during one week in April 1993, and has broad field experience with relevant *Apus* taxa from other field work in most areas of the Middle East and south Asia since 1990, while AG has even broader experience, also encompassing Central Asia, especially Kazakhstan and Uzbekistan.

Results

Table 1 summarises the main plumage features of the five specimens of the 'Dhofar' swifts and the six 'Aden' swifts, their affinities to *A. berliozi* and *A. b. bensoni* and the differences from *A. a. pekinensis* specimens from Iran, India and China, and *A. pallidus* from Oman. As is evident from this, in morphology the southern Arabian birds are closest to *A. berliozi* from Socotra and Africa, and distinguished clearly from *A. a. pekinensis* in underwing pattern, the pale throat patch's size, tail feather width, and to a lesser extent the colour of the primaries. Porter *et al.* (1996) suggested, on the basis of field observations on Socotra, that the differences between *A. berliozi* and *A. a. pekinensis* centred on the former's pale-fringed upperparts feathers, larger white throat patch, slight dark 'saddle' effect on the mantle, overall paler coloration, p10 longest (vs. p9), voice, and an oily sheen to the median and secondary coverts of the upperwing. Our own analysis of specimens suggests that the wingtip character is variable and therefore unreliable. Brooke (1969) too did not find p10 to be longest in *A. berliozi*. Throat patch size does appear to be a consistent and useful

TABLE 1
Plumage characters of the 'Dhofar' and 'Aden' swifts compared to Forbes-Watson's Swift *Apus berliozi* from Socotra and continental Africa (including *A. b. bensoni*), Common Swift *A. apus pekinensis* and Pallid Swift *A. pallidus*. See also Figs. 3–7.

	'Dhofar' birds	'Aden' birds	<i>A. berliozi</i>	<i>A. apus pekinensis</i>	<i>A. pallidus</i>
Upperparts	Blackish to dark brown, darkest on mantle and more dark brown on rump.	Blackish to dark brown, being darkest on mantle.	Blackish to dark brown, darkest on mantle and upper back, some with slight 'saddle' effect contrasting with dark brown rump.	Blackish to dark brown, darkest on lower back / rump creating blackish 'saddle' effect.	Dark brown, little contrast between mantle and back.
Underparts	Blackish underparts with extensive blacker-centred feathers and broad white fringes (reduced with wear).	Blackish underparts with extensive blacker-centred feathers and broad white fringes (reduced with wear).	Blackish underparts with extensive blacker-centred feathers and broad white fringes (reduced with wear).	Mixed blackish / dark brownish underparts with less extensive blacker-centred feathers and fewer and narrower white fringes (further reduced with wear).	Dark brown underparts with darker brown-centred feathers and narrow pale or white-fringed feathers (reduced with wear).
Primaries	Blacker and strongly contrasting with rest of wing and upperparts, while some outer primaries have glossy greenish or purplish-black sheen.	Blackish brown (slightly faded in appearance) but strongly contrasting with rest of wing and upperparts.	Blacker and strongly contrasting with rest of wing and upperparts, with glossy greenish or purplish-black sheen over several outer primaries.	Blacker and strongly contrasting with rest of wing and upperparts, with blackish sheen to outer primaries largely restricted to the feather shaft.	Darker brown and less contrasting with rest of wing and upperparts, with dark brown sheen to outer primaries.
Underparts	Blackish with even blacker-centred feathers and broad white fringes (reduced with wear).	Blackish brown (appearing faded) with darker-centred feathers and broad pale fringes.	Blackish with even blacker-centred feathers and broad white fringes (reduced with wear).	Blackish with even blacker-centred feathers and narrow white fringes (reduced with wear).	Dark brown underparts with darker-centred feathers and broad white or pale fringes (reduced with wear).
Underwing	Blackish / dark brown (some paler than others) and has broad white tips and fringes to underwing-coverts.	Blackish / dark brown underwing with broad white tips and fringes to underwing-coverts.	Blackish / dark brown (some paler than others) and has broad white tips and fringes to underwing-coverts.	Mainly dark brown to blackish underwing (some paler) with narrow white fringes to some underwing-coverts (further reduced with wear).	Greyer underwing-coverts with broad white or pale fringes (reduced with wear).
Throat	Broad, deep whitish or pale throat patch extends almost to upper breast though slightly less extensive on some (see biometrics). Centres of throat feathers possess dark, fine, vertical streaking (which wears off).	Broad, deep pale throat patch extends almost to upper breast (see biometrics). Centres of throat feathers possess dark, fine, vertical streaking (which wears off).	Broad and deep whitish or pale throat patch extends almost to upper breast though slightly less extensive on some (see biometrics). Centres of throat feathers possess dark, fine, vertical streaking (which wears off).	Narrower and less deep whitish or pale throat patch, extending to just over 50% down throat or even less extensive on some birds (see biometrics). Throat lacks fine streaking.	Broad whitish or pale throat patch extends almost to upper breast, though smaller on some birds (see biometrics). Throat lacks any fine streaking.
Tail	Tail has broad feathers (see biometrics).	Tail has broad feathers (see biometrics).	Tail has broad feathers (see biometrics).	Tail feathers narrow (see biometrics).	Tail feathers narrow (see biometrics).

TABLE 2

Biometrics of four taxa of adult *Apus* swifts and the 'Dhofar' / 'Aden' swifts (two juveniles (BMNH 1977.21.16 and BMNH 1977.21.17) obtained by S. M. Brogan, M. D. Gallagher and T. D. Rogers in Dhofar were excluded from the analysis). For data collation protocols see Material and Methods. * = small sample size. NS = not significant.

Character	Taxon	Sample (n)	Mean	SD (±)	Min.	Max.	Comparison <i>t</i> -test with Dhofar / Aden birds
Wing	<i>A. b. bensoni</i> ((females)	4	171.75	6.85	162.0	177.0	NS
	<i>A. b. bensoni</i> (males)	11	172.18	3.84	167.0	178.0	NS
	<i>A. b. berliozi</i> (females)	10	164.85	4.07	157.0	170.0	<i>P</i> = 0.003
	<i>A. b. berliozi</i> (males)	18	168.19	3.08	164.0	173.0	<i>P</i> = <0.001
	Dhofar / Aden (females)	3	173.00	2.00	171.0	175.0	-
	Dhofar / Aden (males)	6	175.50	3.15	171.0	180.0	-
	<i>A. pallidus</i> (females)	2	163.50	0.707	163.0	164.0	NS *
	<i>A. pallidus</i> (males)	5	173.40	3.36	169.0	177.0	NS
	<i>A. a. pekinensis</i> (females)	10	171.80	3.55	166.0	177.0	NS
	<i>A. a. pekinensis</i> (males)	11	173.36	3.53	167.0	178.0	NS
Tail	<i>A. b. bensoni</i> (females)	4	76.75	4.92	73.0	84.0	NS
	<i>A. b. bensoni</i> (males)	11	77.45	2.266	73.5	80.0	<i>P</i> = 0.005
	<i>A. b. berliozi</i> (females)	10	71.85	1.248	70.0	74.0	<i>P</i> = <0.001
	<i>A. b. berliozi</i> (males)	18	75.05	2.849	69.0	79.0	NS
	Dhofar / Aden (females)	3	72.67	2.89	71.0	76.0	-
	Dhofar / Aden (males)	6	72.67	3.78	70.0	80.0	-
	<i>A. pallidus</i> (females)	2	67.00	2.83	65.0	69.0	NS *
	<i>A. pallidus</i> (males)	5	71.50	0.577	71.0	72.0	NS
	<i>A. a. pekinensis</i> (females)	10	71.77	1.922	69.0	75.0	<i>P</i> = 0.002
	<i>A. a. pekinensis</i> (males)	11	74.61	3.35	70.0	80.0	NS
R4 width	<i>A. b. bensoni</i> (females)	4	10.66	0.577	10.0	11.0	NS
	<i>A. b. bensoni</i> (males)	11	10.25	0.890	9.0	12.0	NS
	<i>A. b. berliozi</i> (females)	10	10.35	0.669	9.0	11.0	NS
	<i>A. b. berliozi</i> (males)	18	10.52	0.795	9.0	12.0	NS
	Dhofar / Aden (females)	3	10.50	0.361	10.2	10.9	-
	Dhofar / Aden (males)	6	10.66	0.635	9.9	11.8	-
	<i>A. pallidus</i> (females)	2	9.10	0.141	9.0	9.2	<i>P</i> = 0.008 *
	<i>A. pallidus</i> (males)	5	9.26	1.108	8.2	10.1	<i>P</i> = 0.001
	<i>A. a. pekinensis</i> (females)	10	9.17	0.559	8.0	9.9	<i>P</i> = 0.003
	<i>A. a. pekinensis</i> (males)	11	9.45	0.425	8.5	9.9	<i>P</i> = <0.001
Throat depth	<i>A. b. bensoni</i> (females)	4	25.73	3.26	21.63	28.53	NS
	<i>A. b. bensoni</i> (males)	11	25.21	2.318	22.25	29.82	NS
	<i>A. b. berliozi</i> (females)	10	22.58	1.703	20.05	25.84	NS
	<i>A. b. berliozi</i> (males)	18	23.32	2.132	20.26	27.82	<i>P</i> = <0.001
	Dhofar / Aden (females)	3	24.50	2.80	22.5	27.7	-
	Dhofar / Aden (males)	6	28.16	1.728	26.1	30.3	-
	<i>A. pallidus</i> (females)	2	28.65	2.62	26.8	30.5	NS
	<i>A. pallidus</i> (males)	5	30.80	3.22	27.5	34.3	NS
	<i>A. a. pekinensis</i> (females)	10	22.29	3.28	16.6	26.5	<i>P</i> = <0.001
	<i>A. a. pekinensis</i> (males)	11	21.91	2.986	15.6	25.6	<i>P</i> = <0.001

Throat width	<i>A. b. bensoni</i> (females)	4	22.07	2.79	19.47	24.84	NS
	<i>A. b. bensoni</i> (males)	11	21.52	3.146	15.7	25.15	NS
	<i>A. b. berliozii</i> (females)	10	23.76	1.482	21.44	27.19	NS
	<i>A. b. berliozii</i> (males)	18	23.56	1.501	20.94	26.13	$P = 0.004$
	Dhofar / Aden (females)	3	21.31	1.629	19.43	22.30	-
	Dhofar / Aden (males)	6	20.82	2.63	18.70	24.60	-
	<i>A. pallidus</i> (females)	2	17.25	0.212	17.1	17.4	NS
	<i>A. pallidus</i> (males)	5	19.25	1.848	17.3	21.2	NS
	<i>A. a. pekinensis</i> (females)	10	16.24	2.193	12.1	20.7	$P = 0.004$
	<i>A. a. pekinensis</i> (males)	11	15.70	1.393	13.9	18.5	$P = <0.001$

TABLE 3
Vocal characters of ‘Dhofar’ swifts compared to Forbes-Watson Swift *A. berliozii*, Common Swift *A. apus* and Pallid Swift *A. pallidus*. Frequencies in Hz.

	Sample (n)	Mean peak frequency	Min. peak frequency	Max. peak frequency	Standard deviation	Comparison <i>t</i> -test with Dhofar birds
‘Dhofar swift’ (Oman)	15	3,944.3	3,516	4,493	239.6	
Forbes-Watson Swift (Socotra)	15	3,949.9	3,516	4,354	284.9	NS
Common Swift (Bukhara, Uzbekistan)	15	5,901.9	5,051	6,252	287.5	$P = <0.001$
Pallid Swift (Uludağ, Turkey)	12	5,898.3	5,396	6,391	317.1	$P = <0.001$

distinguishing character, although the preparator’s style can influence this in specimens. The overall paler coloration of *berliozii* and the ‘saddle’ effect are of much more marginal utility. However, with experience, voice is a very useful character for identification (see Table 3 and below). Our biometric analysis, see Table 2, further confirmed that the specimens from Aden and Dhofar possess the characters of *A. berliozii* and not those of *A. a. pekinensis* or *A. pallidus*.

As evidenced in Table 3, there is no significant difference between the mean peak frequencies of the ‘Dhofar swifts’ and Forbes-Watson’s Swift, and their calls appear identical to the human ear, whilst both Common and Pallid Swifts vocalise at significantly higher frequencies.

Sonograms (Fig. 1) also show the differences between Pallid / Common Swifts and the ‘Dhofar’ / Forbes-Watson Swifts. The latter maintain a steady, lower frequency around the mean (4,000 Hz) throughout their ‘scream’, compared to the rising, higher frequency of c.6,000 Hz in both Pallid and Common Swifts, a frequency not achieved by Forbes-Watson’s or the ‘Dhofar’ swifts.

Discussion

The sound-recordings of the ‘Dhofar swifts’ were made in September, post-breeding, with less duetting than in recordings of Forbes-Watson’s Swift made in February on Socotra, i.e. in the early breeding season (Kirwan 2010). Despite this, the recordings are remarkably similar and analysis showed that they were almost identical (Table 3, Fig. 1). The only obvious difference between them was the slightly shorter duration of the ‘Dhofar birds’, which might merely reflect less intensive calling in the post-breeding season (Fig. 1). Recordings of Forbes-Watson’s Swift and the ‘Dhofar swift’ lack the rising and falling

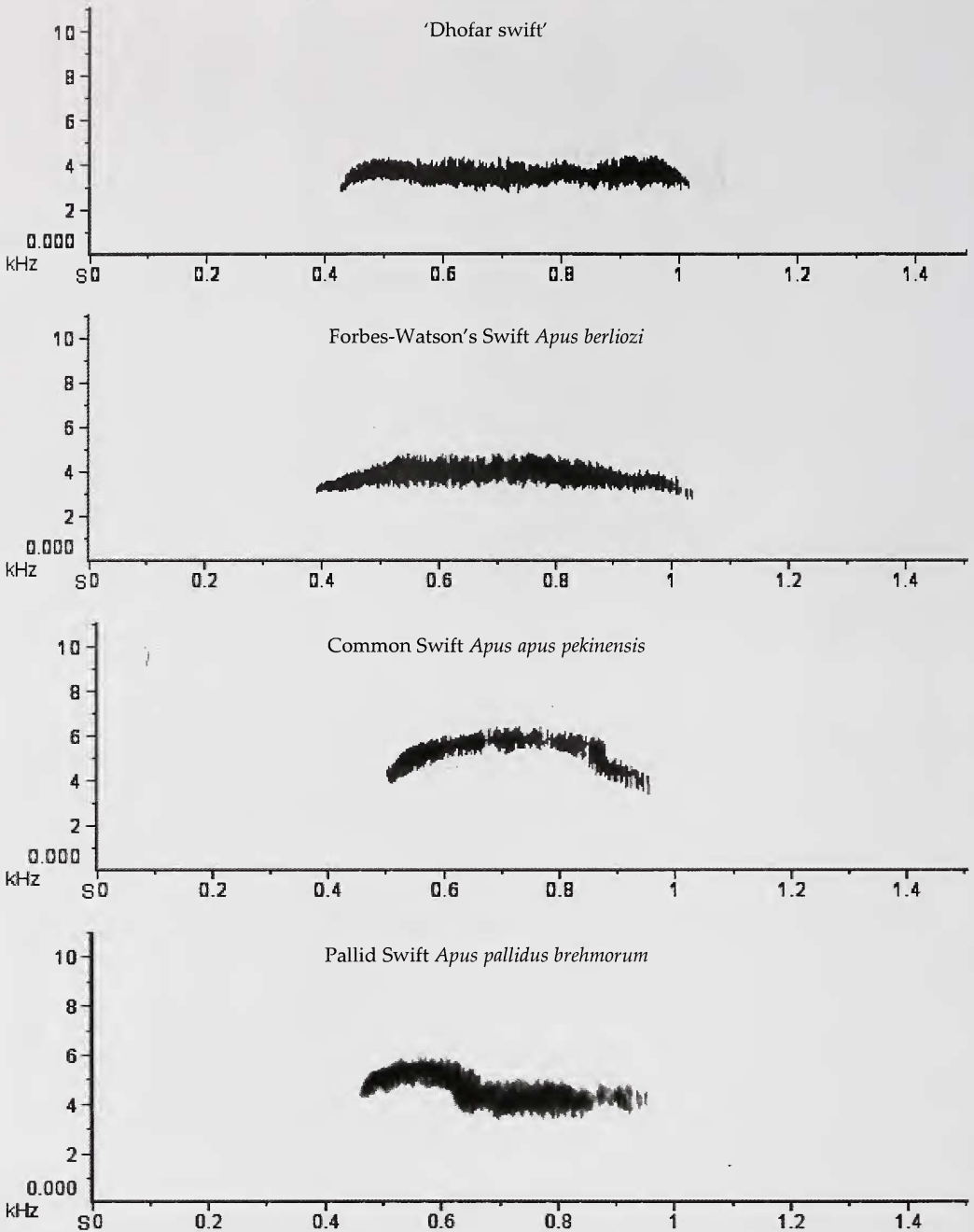


Figure 1. Sonograms of the 'Dhofar swift', Forbes-Watson's Swift *Apus berliozi*, Common Swift *A. apus pekinensis* and Pallid Swift *A. pallidus brehmorum* (see text for recording localities).

component during the main part of the 'scream' of both Pallid Swift and *pekinensis* Common Swift (Fig. 1).

Comparing morphometrics, 'Dhofar', 'Aden' and Forbes-Watson's Swift have similar wing and tail lengths, and the size of the throat patch is as in *A. pallidus*, but all three have



Figure 2. Forbes-Watson's Swift *Apus berliozi*, Jarziz Farm, Salalah, Dhofar, Oman, May 2005; note broad tail feathers, extent of throat patch, white-tipped fringes to underparts and white edges to underwing-coverts forming distinct bars (Andrew Grieve)

significantly broader tail feathers than the latter, when comparing the fourth rectrix of each (Table 2). They also possess much darker plumage than Pallid Swift (Table 1). There were more significant differences compared to *pekinensis*, with the width of the fourth rectrix again being wider, but more noticeable was the throat patch, which was considerably more extensive on the 'Dhofar', 'Aden' and Forbes-Watson's Swifts (Tables 1–2). All of the latter three also had slightly blacker plumage, but this would be generally very difficult to discern in the field, except perhaps in comparative views. The biometric data also revealed that the 'Dhofar' and 'Aden' swifts had closer affinities to *A. b. bensoni*, rather than *A. b. berliozi*, with their similarly longer wings being statistically significant (Table 2). The 'Dhofar swifts' are summer visitors to Oman (and neighbouring eastern Yemen) mainly between April and September, with some probably remaining into October (Eriksen *et al.* 2003, Kirwan 2010). However, it almost certainly is the case that occasional November records of swifts in this region reflect confusion with Pallid Swift (a photograph of one such misidentified bird appears at <http://mikewatsonsdairy.blogspot.co.uk/2009/11/oman-bahrain-2009-with-birdquest-south.html>). The slight difference in wing lengths between *A. b. berliozi* (on Socotra) and the southern Arabian swifts is easily explained because the latter is a migratory population, which presumably winters in continental Africa, whereas the population on Socotra is apparently wholly, or at least, principally resident (Kirwan 2010, Porter & Aspinall 2010). *A. b. bensoni* was described from specimens taken in the boreal midwinter (December–January) in south-east coastal Kenya (Brooke 1969), which in terms of their morphometrics (and plumage) are very similar to those collected in Dhofar (Chantler & Driessens 2000; pers. obs.). Subsequently, additional specimens of *A. b. bensoni* (also at NMNH) were collected by J. S. Ash in coastal Somalia, between April and August in 1979–80. Fry (1988) and Ash & Miskell (1998) noted that this population is also resident or perhaps partially migratory, and breeding has been recorded in most months between March and December. Those in southern Somalia have been considered to be intermediate



Figures 3–4. Forbes-Watson’s Swift *Apus berliozi* specimens held in the Smithsonian Institution, National Museum of Natural History (NMNH), Washington DC, left to right: female *A. b. berliozi*, Socotra Island, May 1964; male *A. b. berliozi*, Socotra Island, May 1964 (holotype); female *A. b. bensoni*, coastal Kenya, January 1966 (holotype); and male *A. b. bensoni*, coastal Kenya, January 1966 (Guy M. Kirwan / © NMNH)

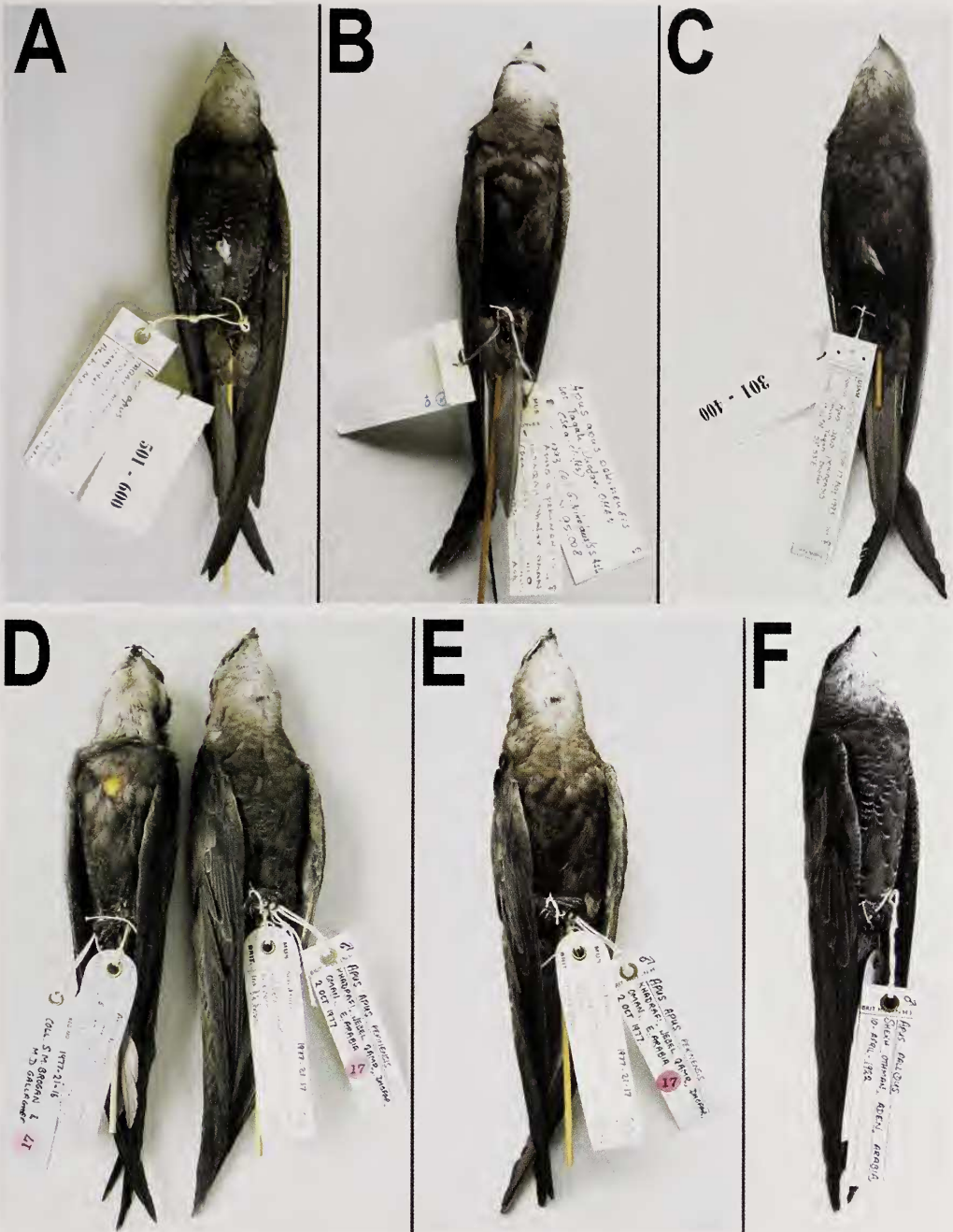


Figure 5. The six specimens of ‘Dhofar’ swifts and one of the six ‘Aden’ swifts. ‘Dhofar’ swift (A) collected by J. S. Ash & G. Nikolaus (Andrew Grieve © Natural History Museum, Tring). ‘Dhofar’ swift (B) collected by J. S. Ash & G. Nikolaus (Andrew Grieve © Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn). ‘Dhofar’ swift (C) collected by J. S. Ash & G. Nikolaus (Guy M. Kirwan © National Museum of Natural History, Washington DC). Two ‘Dhofar’ swifts (D) collected by M. D. Gallagher (Andrew Grieve © Natural History Museum, Tring). Juvenile ‘Dhofar’ swift (E) collected by M. D. Gallagher (excluded from biometric analysis) (Andrew Grieve © Natural History Museum, Tring). One of six ‘Aden’ swifts (F) collected by R. Meinertzhagen (Andrew Grieve © Natural History Museum, Tring). Note general darkness of underparts, extent of the pale throat patch, fine dark streaking on throat and typically some white-tipped feathers on underparts.



Figure 6. Forbes-Watson's Swift *Apus berliozi* specimens held in the Smithsonian Institution, National Museum of Natural History (NMNH), Washington DC, left to right: male *A. b. berliozi*, Socotra Island, May 1964 (holotype); female *A. b. bensoni*, coastal Kenya, January 1966 (holotype); female *A. b. berliozi*, Socotra Island, May 1964; and female *A. b. bensoni* (?), south-west Oman, May 1993 (Guy M. Kirwan / © NMNH)

in size between *A. b. berliozi* and *A. b. bensoni* collected in Kenya (Fry 1988) and as a result Ash & Miskell (1998) suggested that their racial separation is only doubtfully valid.

Brooke (1969) stated that *A. b. bensoni* differs from nominate *berliozi* 'in being darker and browner throughout, in being somewhat larger ... and with faint dark shafts to the white throat feathers'. However, as Figs. 3–4 and 6–7 demonstrate, colour differences between the two subspecies are practically undetectable, while both taxa can show dark shaft-streaks to the white throat feathers. Thus, with the exception of the slight increase in wing length between *A. b. berliozi* from Socotra vs. those specimens from southern Arabia ascribed to Forbes-Watson's Swift and the *A. b. bensoni* specimens from Kenya and Somalia, there are no differences in morphology that cannot be accounted for by wear and moult state. Consequently, we suggest that *A. b. bensoni* can be upheld, marginally, solely on the basis of its slightly longer wing than *A. b. berliozi*, but that some authorities might prefer to regard Forbes-Watson's Swift as a monotypic species.

Our reinvestigation of the problem posed by the 'Dhofar swift' (Fig. 5), which was previously considered to represent either Pallid Swift or Common Swift of the subspecies *pekinensis*, reveals that these birds can be confidently identified as Forbes-Watson's Swift. The same is true of the Aden specimens (Fig. 5) 'discovered' in the Tring collection during the course of this work. These latter specimens from the Meinertzhagen (1924) collection, like all of his material, require closer verification. M. C. Jennings has drawn our attention to the fact that in the same work Meinertzhagen (1924) reported an Arabian Accentor *Prunella fagani* from an unusually low elevation, but this specimen (and another in the Meinertzhagen collection) prove to have been stolen from G. W. Bury (Rasmussen & Prÿs-Jones MS). In the



Figure 7. *Apus* specimens held in the Smithsonian Institution, National Museum of Natural History (NMNH), Washington DC, left to right: female *A. berliozi bensoni* (?), south-west Oman, May 1993; female *A. a. apus*, coastal Kenya, February 1966; female *A. b. berliozi*, Socotra Island, May 1964; and male *A. a. apus*, coastal Kenya, February 1966 (Guy M. Kirwan / © NMNH)

case of the 'Aden' swifts, it appears that we can be sure of their provenance. The birds' original labels are annotated as being collected by H. L. Powell and the preparation can be matched to his rather unusual style (the incision is made under the right wing), while close reading of Meinertzhagen's text makes it obvious that they could only have been taken by Powell. Furthermore, the only south-west Arabian collection available in the early 1920s from which Meinertzhagen could have readily stolen other specimens was Bury's. Neither Sclater (1917) nor Hartert (1917) mentioned that Bury collected any Apodidae other than Little Swift *Apus affinis*.

The field and museum work reported here formed the substantive basis for much of the relevant species account in the recently published Arabian bird atlas (Kirwan 2010). On current knowledge, Forbes-Watson's Swift appears to be a migrant breeder at coastal sites in Dhofar, Oman, as well as discontinuously westwards along the southern Yemeni coast, and on some offshore islands, as far west as Aden (Jennings 2003, Kirwan 2010).

Acknowledgements

We are grateful to staff members at the Natural History Museum, Tring (Robert Prÿs-Jones and Mark Adams) and National Museum of Natural History, Washington DC (James P. Dean, Christina Gebhardt, Chris Milensky and Brian Schmidt) for their assistance at these institutions. In particular, Robert Prÿs-Jones assisted in establishing the provenance of the 'Aden' swifts. Renate van den Elzen is thanked for expediting the loan of the specimen of *A. berliozi* held at the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, to the Tring museum. Richard Porter provided a sound-recording of *A. berliozi* from Socotra. Our referees, Mike Jennings and Richard Porter, contributed variously to the final manuscript.

References:

- Ash, J. S. & Miskell, J. E. 1998. *Birds of Somalia*. Pica Press, Robertsbridge.
- Brooke, R. K. 1969. *Apus berliozi* Ripley, its races and siblings. *Bull. Brit. Orn. Cl.* 89: 11–16.
- Brooks, D. J., Evans, M. I., Martins, R. P. & Porter, R. F. 1987. The status of birds in North Yemen and the records of the OSME expedition in autumn 1985. *Sandgrouse* 9: 4–66.
- Bundy, G. 1986. Blackstarts in southern Oman. *Sandgrouse* 7: 43–46.
- Chantler, P. & Driessens, G. 2000. *Swifts: a guide to the swifts and treeswifts of the world*. Second edn. Pica Press, Robertsbridge.
- Dickinson, E. C. (ed.) 2003. *The Howard and Moore complete checklist of the birds of the world*. Third edn. Christopher Helm, London.
- Dickinson, E. C., Overstreet, L. K., Dowsett, R. J. & Bruce, M. D. (eds.) 2011. *Priority! The dating of scientific names in ornithology: a directory to the literature and its reviewers*. Aves Press, Northampton.
- Eriksen, J., Sargeant, D. E. & Victor, R. 2003. *Oman bird list: the official list of the birds of the Sultanate of Oman*. Sixth edn. Centre for Environmental Studies and Research, Sultan Qaboos Univ., Muscat.
- Evans, M. I. 1994. *Important Bird Areas in the Middle East*. BirdLife International, Cambridge, UK.
- Fry, C. H. 1988. Apodidae, spinetails and swifts. Pp. 197–242 in Fry, C. H., Keith, S. & Urban, E. K. (eds.) *The birds of Africa*, vol. 3. Academic Press, London.
- Gallagher, M. D. & Rogers, T. D. (1980). On some birds of Dhofar and other parts of Oman. *J. Oman Stud., Spec. Rep.* 2: 347–385.
- Gallagher, M. D. & Woodcock, M. 1980. *The birds of Oman*. Quartet Books, London.
- Gill, F. & Wright, M. 2006. *Birds of the world: recommended English names*. Christopher Helm, London.
- Guichard, K. M. & Goodwin, D. 1952. Notes on birds collected and observed in Oman and Hadhramaut. *Ibis* 94: 294–305.
- Hartert, E. 1917. A few notes on the birds of Yemen. *Novit. Zool.* 24: 454–462.
- Jennings, M. C. 1981. *The birds of Saudi Arabia: a check-list*. Privately published, Whittlesford.
- Jennings, M. C. 1995. *An interim atlas of the breeding birds of Arabia*. National Commission for Wildlife Conservation & Development, Riyadh.
- Jennings, M. C. 2003. ABBA Survey 31: Bir Ali and Red Sea Islands, Yemen. *Phoenix* 19: 11–20.
- Jennings, M. C. (ed.) 2010. *Atlas of the breeding birds of Arabia*. Fauna of Arabia 25. Frankfurt & King Abdulaziz City for Science & Technology, Riyadh.
- Kirwan, G. M. 2010. Forbes-Watson's Swift *Apus berliozi*. Pp. 438–440 in Jennings, M. C. (ed.) *Atlas of the breeding birds of Arabia*. Fauna of Arabia 25. Frankfurt & King Abdulaziz City for Science & Technology, Riyadh.
- Kirwan, G. M., Martins, R. P., Morton, K. M. & Showler, D. A. 1996. The status of birds in Socotra and 'Abd Al-Kuri and the records of the OSME survey in spring 1993. *Sandgrouse* 17: 83–101.
- Meinertzhagen, R. 1924. A contribution towards the birds of Aden Protectorate. *Ibis* 11(6): 625–642.
- Porter, R. & Aspinall, S. 2010. *Birds of the Middle East*. Second edn. Christopher Helm, London.
- Porter, R. F. & Martins, R. P. 1996. Southern Yemen and Socotra: the report of the OSME survey in spring 1993. *Sandgrouse* 17: 1–188.
- Porter, R. F., Dymond, J. N. & Martins, R. P. 1996. Forbes-Watson's Swift *Apus berliozi* in Socotra. *Sandgrouse* 17: 138–141.
- Ripley, S. D. 1966. Le martinet pale de Socotra. *Oiseau et R.F.O.* 35 (no. spéc.): 101–102.
- Sclater, W. L. 1917. The birds of Yemen, south-western Arabia, with an account of his journey thither by the collector, Mr. G. Wyman Bury. *Ibis* (10)5: 129–186.
- Sibley, C. G. & Monroe, B. L. 1990. *Distribution and taxonomy of the birds of the world*. Yale Univ. Press, New Haven, CT & London, UK.
- Sjölander, K. & Beskow, J. 2000. WaveSurfer—an open source speech tool. Pp. 464–467 in Yuan, B., Huang, T. & Tang, X. (eds.) *Proc. Sixth Intern. Conf. on Spoken Language Processing*, Beijing.
- Smith, K. D. 1956. On the birds of the Aden Protectorate. *Ibis* 98: 303–307.
- Stagg, A. 1984. *The birds of S.W. Saudi Arabia: an annotated checklist*. Privately published, Riyadh.
- Tibbet, S. 2006. Forbes-Watson's Swifts nesting in Dhofar. *Phoenix* 22: 23.
- Addresses: Andrew Grieve, 3 Miriam Close, Second Avenue, Caister-on-Sea, Great Yarmouth, Norfolk NR30 5PH, UK, e-mail: ag1947@hotmail.co.uk. Guy M. Kirwan, Research Associate, Field Museum of Natural History, 1400 South Lakeshore Drive, Chicago, IL 60605, USA, e-mail: GMKirwan@aol.com